Comments of The Utility Reform Network (TURN)
on Residential Peak Load Reduction
for the CEC Electricity Committee Workshop on the July 2006 Heat Storm
August 29, 2006

Introduction and Overview

The Commission's workshop notice states:

> "California and the neighboring western states experienced extreme hot weather conditions, also referred to as a "heat storm," from July 15 through July 28, 2006. On July 24, the California Independent System Operator (CAISO) reported system peak demand of nearly 51,000 megawatts, the highest peak in CAISO's history. Electricity system loads were especially high because both Northern and Southern California experienced record temperatures at the same time. While there were no system wide blackouts, there were thousands of local power interruptions."

TURN, as a prepresentative of residential and small business customers of PG&E and SCE, appreciates the opportunity to participate in this workshop. We share the CEC's concerns regarding the adverse economic and social welfare effects on the July 2006 heat storm on electric reliability and service in the state of California. We also understand that this workshop as currently structured is heavily focused on supply resources and metering issues.

Nevertheless, TURN believes it is appropriate to remind the CEC that there are other important options. California seems to be neglecting several key programs to reduce peak summer energy use – under both normal and heat storm conditions. These programs involve going back to the basics of energy efficiency, fuel choice, and demand-side resources that do not depend on new meters. Our comments today focus on what can and should be done to mitigate adverse effects from possible future heat storms through these types of programs focused on critical peak.

The CEC's "Key Questions" make reference to a handful of demand-side management (DSM) activities and programs including interruptible and demand response programs, time of use pricing, smart meters, as well as customer voluntary efforts to reduce demand. TURN agrees that these are all significant and valuable ways to help manage peak and critical peak demand, and that more can and should be done in each of these areas. However, California must also go more directly to the source of its critical peaking problems: residential space cooling load – as well as other residential loads that are coincident with critical peak hours such as swimming pools and electric cooking loads.

TURN supports an integrated program of technological solutions to address the peak and critical peak load problem – not just supply resources and price-oriented demand response through CPP and AMI. Pricing in and of itself will not will solve our problems;

we need common-sense engineering solutions to reduce peak power needs as well. Though the IOUs' through their 2006-2008 portfolios have taken initial positive steps improve the efficiency of residential space cooling load, the projected savings are still relatively small. Further, more attention should be given to air conditioner cycling, interruption of swimming pool pumps, and promotion of gas stoves that will reduce loads during the later part of a critical peak period (5 to 7 pm), while increasing end-use efficiency.

TURN recommends that the CEC work with the CPUC in overseeing the development of a more comprehensive, integrated and aggressive set of statewide energy efficiency programs and activities to reduce residential space cooling electricity load. This work should begin immediately within the parameters of the IOUs' 2006-2008 EE portfolios

Our comments are organized as follows:

- Relevant excerpts CEC's 2005 IEPR regarding relationship of air conditioning load to peak demand.
- TURN update to the CEC on the IOUs' 2006-2008 portfolios.
- Discussion supporting the point that DRP and smart meters are not a substitute for residential HVAC efficiency and air conditioning load management or cycling.
- Review of other key means of reducing peak load problems (gas stoves and swimming pool pump trippers)

The CEC's 2005 IEPR and Peak Load Issues

The 2005 IEPR is very instructive regarding air conditioning loads and peak demand:

> "One concern about current energy efficiency programs is that they tend to focus on energy savings rather than peak savings. Because California's electricity demand is characterized by short summer peaks, reducing peak demand is essential for electricity reliability and tempering price volatility, and to avoid the need for expensive power plants that operate only a few hours a year. The Energy Commission recommends an increased emphasis on energy efficiency programs that provide peak savings." (pg E-4)
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> "Electricity demand in California increases most dramatically in the summer with high air conditioning loads. The generation system must be able to accommodate these high summer peaks in addition to demand swings caused by weather variability and the economy. Though peak demand periods typically occur only between 50-100 hours a year, they impose huge burdens on the electric system. (pg 37)
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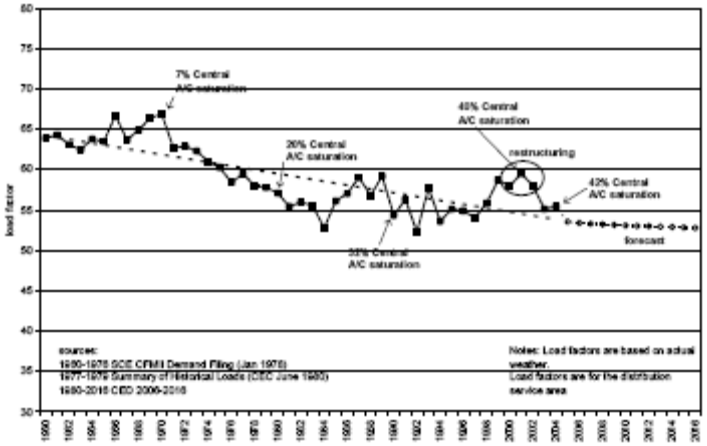
> "One measure of the "peakiness" of the electric system is load factor, which measures the relationship between annual peak in MW to annual consumption in MWh. If peak demand grows faster than the annual average consumption, the load factor decreases. As shown in Figure 9, weather-adjusted load factors in recent years have decreased as air conditioner loads increased.

Figure 9: SCE Historic Load Factors 1960-2004



"One problem with meeting peak demand is that most new gas-fired power plants are combined-cycle units designed to run at high load factors where they are most efficient and can generate enough revenue to recoup investments. Combined-cycle plants also have less capability to ramp up and down to meet peak demand than the older steam boiler units which make up the majority of California's fleet of aging power plants. While some utilities have invested in simple-cycle peaking plants that run just a few hours each year, virtually all of the state's new power plants are combined-cycle and are not well matched to swings in system demand. California must quickly and thoughtfully craft solutions for meeting its increasingly "peaky" demand. (pg 38)

"California policy makers must improve their efforts to reduce electricity demand growth and shave peak demand through energy efficiency and demand response programs.

"Energy efficiency is the first priority in California's loading order. Energy efficiency programs reduce the state's reliance on natural gas and the need for new power plants by reducing the amount of energy consumed in the state. By decreasing peak demand, these programs can also increase the reliability of the electricity system while reducing environmental impacts and the cost of electricity. (pg 56)

Summary Update on the IOUs' 2006-2008 Energy Efficiency Portfolios

In our presentation to the CEC July 11, 2005 workshop, TURN expressed several concerns regarding the IOUs' then-draft 2006-2008 EE portfolios. What follows is an update/status report on those concerns.

- <u>The IOUs' 2006-2008 portfolios are not improving the IOUs' system load factors.</u> As shown in Table 1, the IOUs' 2006-2008 energy efficiency portfolios will not result in any improvements in IOU system load factors.

Table 1 2006-2008 (3-yr average) System Load Factors		
	w/o EE	w/ EE
SCE	51.2%	51.4%
PG&E	57.1%	57.1%
SDG&E	56.4%	56.5%

- Projected peak demand savings from residential HVAC efficiency are relatively small. Table 2 reflects that the projected peak demand savings in the IOUs' 2006-2008 EE portfolios for residential space cooling or HVAC end use for the residential category are relatively small. PG&E leads the group with a projected 52 MW or 9% of its total 601 MW peak savings from residential HVAC; followed by SCE at 11 MW or 2% of its total 691 peak savings; and SDG&E at 2 MW or 1% of its total 213 MW peak savings.

Table 2: IOUs' 2006-2008 Portfolio Projected Savings by the Space Cooling and Lighting End Uses and Customer Categories

PG&E	MW	%T	Gwh	%T	***SCE***	MW	%T	Gwh	%T	***SDG&E***	MW	%T	Gwh	%T
Total	601		3,005		Total	691		3,476		Total	213		1,002	
HVAC	151	25%	337	11%	HVAC	116	17%	568	16%	HVAC	53	25%	160	16%
Lighting	**246**	**41%**	**79**	**54%**	**Lighting**	**327**	**47%**	**1618**	**47%**	**Lighting**	**90**	**42%**	**591**	**59%**
Residential					*Residential*					*Residential*				
Total	127	21%	599	20%	Total	239	35%	1151	33%	Total	70	33%	391	39%
HVAC	**52**	**9%**	36	1%	**HVAC**	**11**	**2%**	51	1%	**HVAC**	**2**	**1%**	0	0%
Lighting	61	10%	492	16%	Lighting	185	27%	900	26%	Lighting	30	14%	311	31%
Commercial					*Commercial*					*Commercial*				
Total	448	75%	2,285	76%	Total	376	55%	1,893	54%	Total	132	62%	581	58%
HVAC	84	14%	247	8%	HVAC	94	14%	467	13%	HVAC	41	19%	251	25%
Lighting	180	30%	1,093	36%	Lighting	142	21%	718	21%	Lighting	60	28%	281	28%

- The IOUs could improve the "yield" of peak and critical peak demand savings relative to annual energy savings within the current approved portfolio budgets. Table 2 also shows that the IOUs' 2006-2008 Portfolios are about one-half lighting: for PG&E projected lighting efficiency savings are 41% of the MW and 54% of the Gwh savings; for SCE projected lighting efficiency savings are 47% of the MW and Gwh savings; and for SDG&E projected lighting efficiency savings are 42% of the MW and 59% of the Gwh savings.

  TURN is not adverse to lighting efficiency. Rather, TURN believes that the IOUs should work to increase residential HVAC savings while maintaining lighting savings. In other words, increase the "yield" of peak demand and annual energy savings per dollar of energy efficiency investment. TURN suggests that this is doable within the current portfolio budgets because lighting efficiency bulb and fixture costs are pegged at retail prices, when the IOUs are in part or whole buying down the price at the manufacturer wholesale level. *In essence, the*

budgets for achieving lighting savings appear to be significantly inflated to us. However, even if policy makers do not agree with TURN on the inflated cost of lighting, they should provide additional long-term and persistent savings by changing program emphasis to comprehensive programs to capture "lost opportunities" in appliances and new construction – particularly savings with a peak oriented component such as residential HVAC.

Demand Response Programs and Smart Meter Applications are not a Substitute for Residential HVAC Efficiency and Load Management or Cycling

California needs to take a comprehensive and integrated look at reducing peak and critical peak load. The CPUC and CEC have initiated a number of AMI proceedings, demand response proceedings, photovoltaic proceedings and energy efficiency proceedings. TURN believes it vital that the state take an integrated comprehensive look at ways to reduce and manage residential critical peak load. We support an integrated program of technological solutions to address the peak load problem – not just demand response pricing, CPP and AMI. Pricing in and of itself will not will solve our problems; we need common-sense engineering solutions to reduce peak power needs as well. There has been only limited attention given to air conditioner cycling (despite success by SMUD and Southern California Edison). To its credit, SDG&E has contracted with Comverge to provide one of the most successful third-party demand response programs in the country. Interval meters make sense to a limited subset of IOU customers at certain threshold size requirements. (SDG&E 20 kW in size). However, TURN supports a different and considerably cheaper technological solution to achieve demand response program savings among smaller customers – expand the existing Comverge program. Comverge is already successfully and cost-effectively delivering a technologically sophisticated demand response solution in SDG&E's territory, providing 17 MW of demand response as of the end of June 2006 and contracted to provide 70 MWof demand response savings. The Comverge platform provides higher qualitysavings that can be measured immediately (rather than statistically estimated after the fact) and can ultimately bid into imbalance and reserve markets.

Air conditioner efficiency will not only save energy on the 15 or fewer days when a CPP program might be operated but would save energy for an additional 50-100 days per year. In the residential sector, this type of program is starting, albeit relatively slowly. The IOUs as part of their 2006-2008 energy efficiency portfolios are launching what is hoped to be a successful statewide HVAC quality installation (QI) campaign. The 2006 federal standards for high efficiency central air conditioners (SEER 10 to 13) created a tremendous opportunity to move past simple cash incentives for higher efficiency units, to improving the efficiency of space conditioning (cooling and heating) from a whole systems, whole market, perspective. Proper air conditioner installation and operation are critical components of effective space conditioning efficiency programs. New equipment which is installed or operated improperly will not operate at its rated efficiency. For instance, without proper refrigerant charge and air flow, new "high efficiency" air conditioners can be just as inefficient as the units they replace. Also, residential duct systems may offer homeowners one of the best opportunities to increase the energy efficiency and comfort to the entire home. A significant ramp-up of this program, in

conjunction with market-transforming cash rebates to promote even higher efficiency equipment ,should be at the top of the IOUs priority list – above meters that only save peak energy for a few days per year.

Gas Stoves Reduce Residential Critical Peak Loads, But Their System Benefits Have Been Ignored by Policy-Makers.

An electric stove will typically be used between 5 and 7 pm, driving up use during "critical peak" hours dramatically and increasing distribution peaks. An electric stove also will use considerably more gas (with its electric resistance burners) than a gas stove – as much as four times as much on a peak day and more than twice as much even if the marginal unit is a combined cycle. Fuel switching from electric to gas stoves will not reduce load in the single "headline" peak hour (which occurs around 4-5 pm), but will reduce critical loads after the peak, thus reducing system stress and reducing the needs for extraordinary measures such as use of interruptible loads until as late as 7 or 8 pm. Gas stoves will also reduce electric distribution peaks in residential areas (which typically occur around 7 pm). Measured against critical peak hours, an electric stove's load factor is only about 25%.

To get residential customers' loads out of the critical peak, encouraging gas stoves will have a more reliable payback than pricing programs (which may be of limited effectiveness in getting customers not to cook). By comparison, gas stoves are excellent loads for gas utilities, since they are used year-round, and the specific hour of the peak on a winter day is not as important for a gas utility because of line pack. Therefore, Title 24 standards, line extension rules, and utility programs should be redesigned to encourage gas stoves and ovens.

It is a "No-Brainer" to <u>Require</u> Swimming Pool Pump Trippers.

Another piece of low-hanging fruit should be captured by the IOUs before they buy expensive supply resources or begin sinking hundreds of millions of dollars into meter infrastructure. The IOUs should take immediate steps to see that at least new if not existingresidential swimming pools are equipped with load control devices that the utility can use at its discretion for up to 1000 hours per year. If a household can afford to install and maintain a swimming pool, it is reasonable to require that household to be responsible for keeping its pool load out of the critical peak period without requiring the utility to pay for such curtailment.

We should not coddle swimming pool owners witn information programs to hope that they will do their right thing or bribe them with critical peak pricing tariffs that might not cause people with high enough incomes to own swimming pools to change their behavior. The Commission should use direct utility load control to <u>require</u> pool owners to keep their pools out of the peak period with direct utility load control. This is a case where regulation of a discretionary load (the time of day when a pool pump is used) is clearly preferable to other less intrusive means of dealing with swimming pool loads. Regulation of swimming pool loads is also preferable to gaining the same savings by using pricing to force the elderly to risk heat stroke by not cooling their homes in order to

have affordable electricity. Swimming pool pump controls should be achieved through a combination of tariffs, local building permit processes, and Title 24 changes.

Building Standard Enforcement

TURN believes that more emphasis should be placed on enforcement of Title 24 standards. Failure by builders to deliver energy efficiency and peak load savings required by Title 24 is consumer fraud, pure and simple, raising customers' bills unnecessarily and resulting in unfair competition against those builders who actually meet the standards by those who are deficient. Local building officials place significant emphasis on non-energy health and safety issues (and they should), but to the extent that less emphasis is placed on assuring assure that energy savings are met, California is left with a fleet of inefficient buildings that consume too much peak power, increase system stress, and raise costs to consumers.

TURN Recommendations

California should step back from the rate-base oriented mode of promoting a combination of supply side resources and advanced meters, even though those programs are most advantageous to utility shareholders, while giving short shrift to other peak-oriented programs. Given that peak loads are a problem, the following demand-side resources should be given higher priority:

(1) higher air conditioning efficiency levels above the Bush Administration's new minimum standard

(2) quality installation of air conditioners and associated ductwork (including proper sizing and charging of air conditioners);

(3) early replacement of inefficient air conditioners in hot zones like the Central Valley (particularly those owned by low income people);

(4) air conditioner cycling including use of sophisticated programs such as those offered by Comverge;

(5) regulatory policy to promote the choice of gas instead of electric stoves; and

(6) mandatory swimming pool pump trippers; and

(7) enforcement of building standards.

These resources will reduce peak demand during both normal and heat-storm conditions with greater certainty than pricing programs that are subject to snapback and persistence during multi-day events, while saving considerable amounts of energy not saved by pure pricing programs.

Respectfully submitted,

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